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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.  | CONFIRMATION NO. |
|---|-------------|----------------------|----------------------|------------------|
| 10/046,914  | 01/17/2002  | Yakov Sidorin        | 4090-3               | 3385             |
| 23117   | 7590        | 08/19/2004           | EXAMINER             |                  |
| NIXON & VANDERHYE, PC<br>1100 N GLEBE ROAD<br>8TH FLOOR<br>ARLINGTON, VA 22201-4714 |             |                      | FLORES RUIZ, DELMA R |                  |
|   |             |                      | ART UNIT             | PAPER NUMBER     |
|   |             |                      | 2828                 |                  |

DATE MAILED: 08/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                      |                        |  |
|------------------------------|----------------------|------------------------|--|
| <b>Office Action Summary</b> | Application No.      | Applicant(s) <b>OK</b> |  |
|                              | 10/046,914           | SIDORIN, YAKOV         |  |
|                              | Examiner             | Art Unit               |  |
|                              | Delma R. Flores Ruiz | 2828                   |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 May 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-38 and 43-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-38 and 43-63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)     | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION*****Claim Objections***

Claim 36 is objected to because of the following informalities: Where applicant acts as his or her own typographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "last" in claim 36 is used by the claim to mean "laser", while the accepted meaning is "laser." The term is indefinite because the specification does not clearly redefine the term.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 26 –28, 33 – 38 and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuyama et al (5, 434,426).

**Regarding claims 26, 43 and 44,** Furuyama discloses a tunable optical device comprising; a semiconductor laser (see Fig. 3a Character 120) diode and a feedback section (Furuyama discloses an "wavelength selective (Column 7, Lines 13 – 28 and fig. 8a) which is considered to be the claimed feedback section as defined by applicant in the specification on page 6 lines 20 – 25) for providing wavelength selective (Fig. 8a, Column 7, Lines 13 – 28 and Column 17, Lines 14 – 59) feedback to the laser diode wherein the feedback section comprises; a zone plate device (see Fig. 3B, Character 111) for delivering optical radiation a predetermined location for use in said feedback, the zone plate device providing a non-rectilinear diffraction grating which diffract incident radiation onto an optical axis through the device (Column 11, Lines 45 – 60); and control means for controlling optical performance of the zone plate device wherein said control means comprises means to change the refractive index of material of the zone plate device so as to change the wavelength of the optical radiation delivered at said predetermined location and the zone plate device provides at least part of an external cavity in relation to the laser diode and the external cavity is entirely provided in material other than air ((See Figs. 3A, 4, 5A, 6B and 8A-FColumn 17, Lines 20 – 39 and 48 – 59, Column 20, Lines 15 – 18,

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Column 22, Lines 1 – 14, Column 24, Lines 14 – 47, Column 25, Lines 42 – 49 and Column 27, Lines 18 – 22).

**Regarding claim 27**, Furuyama discloses a tunable optical device, wherein the control means comprises means to apply an electric field to said material of the zone plate device (Column 6, Lines 63 – 68 and Column 7, Lines 1 – 2).

**Regarding claims 33 and 63**, Furuyama discloses a control means comprises electrodes (see Fig. 8A, Characters 176 and 177) extending from the first facet to the second facet for creating an electric field in the piece of material.

**Regarding claim 34**, Furuyama discloses a zone plate device provides amplitude zone plate elements (see Figs. 1B, 4, 5A and 6B).

**Regarding claim 35**, Furuyama discloses a zone plate device provides phase zone plate elements (said limitation only recites facts and features that are well known and expected, the same features that essentially result from the use or application of a zone plate device provides phase zone plate elements, and therefore said limitations are said to be inherently disclosed in the teachings of Furuyama).

**Regarding claim 36**, Furuyama discloses a laser diode (see Fig. 3B) optically coupled to a zone plate device for providing wavelength selective optical feedback to the laser diode, wherein the method comprises the step of applying an electric field to material of the zone plate device so as to change its optical performance (see Figs. 1B, 4, 5A 6 B and 8A, Column 7, Lines 13 – 28, Column 17, Lines 14 – 59, Column 20, Lines 15 – 18, Column 22, Lines 1 – 14, Column 24, Lines 14 – 47, Column 25, Lines 42 – 49 and Column 27, Lines 1 8 – 22).

**Regarding claim 37**, Furuyama discloses the step of applying an electric field to material of the zone plate device changes its optical performance so as to change the wavelength at which the zone plate device forms an image in a predetermined image plane (see Figs. 1B, 4, 5A and 6B, Column 17, Lines 20 – 39 and 48 – 59, Column 20, Lines 15 – 18, Column 22, Lines 1 – 14, Column 24, Lines 14 – 47, Column 25, Lines 42 – 49 and Column 27, Lines 1 8 – 22).

**Regarding claim 38**, Furuyama discloses zone plate device for frequency filtering of optical radiation so as to deliver radiation of a selected frequency at a predetermined location , wherein the method comprises the step of applying an electric field to material of the zone plate device so as to change its optical performance whereby the frequency selected for delivery at the predetermined location is changed (see Figs. 1B, 4, 5A, 6B, and 8A-F, Column 17, Lines 20 –

39 and 48 – 59, Column 20, Lines 15 – 18, Column 22, Lines 1 – 14, Column 24, Lines 14 – 47, Column 25, Lines 42 – 49 and Column 27, Lines 18 – 22).

**Regarding claim 45,** Furuyama discloses a zone plate device comprises a piece of material, optically transparent over a range of wavelength (said limitation only recites facts and features that are well known and expected, the same features that essentially result from the use or application of a zone plate device comprises a piece of material, optically transparent over a range of wavelength, and therefore said limitations are said to be inherently disclosed in the teachings of Furuyama) which, in use, is optically coupled to a facet of the laser diode<sup>3</sup> and transmits optical radiation from the diode to the non-rectilinear diffraction grating (see Fig. 3B Character 111) said piece of material providing the material whose refractive index is changed by the control means so as to control the wavelength of the optical radiation delivered at said predetermined location (Fig. 8a, Column 7, Lines 13 – 28 and Column 17, Lines 14 – 59).

**Regarding claims 46 and 47,** Furuyama discloses a non-rectilinear diffraction grating is constructed as variation in refractive index in material of the zone plate device and the non-rectilinear diffraction grating is arranged to image incident radiation, the radiation having a selected wavelength, onto a predetermined image plane (see Figs. 1B, 4, 5A and 6B, Column 17, Lines 20 –

39 and 48 – 59, Column 20, Lines 15 – 18, Column 22, Lines 1 – 14, Column 24, Lines 14 – 47, Column 25, Lines 42 – 49 and Column 27, Lines 18 – 22).

***Regarding claim 48 and 49,*** Furuyama discloses a the incident radiation is received from an object plane and the object and image planes are coincident and the zone plate device is arranged in fixed relation to the image plane (said limitation only recites facts and features that are well known and expected, the same features that essentially result from the use or application of a the incident radiation is received from an object plane and the object and image planes are coincident and the zone plate device is arranged in fixed relation to the image plane, and therefore said limitations are said to be inherently disclosed in the teachings of Furuyama).

***Regarding claims 50 and 51,*** Furuyama discloses a image plane is coincident with a surface of the zone plate device and the non-rectilinear diffraction grating is rotationally symmetric (said limitation only recites facts and features that are well known and expected, the same features that essentially result from the use or application of a image plane is coincident with a surface of the zone plate device and the non-rectilinear diffraction grating is rotationally symmetric, and therefore said limitations are said to be inherently disclosed in the teachings of Furuyama).



**Regarding claim 58**, Furuyama discloses a zone plate device is optically coupled directly to a facet of the laser diode (see Fig. 3).

**Regarding claim 62**, Furuyama discloses a tunable optical device comprising: a zone plate device (see Fig. 3A Character 120) for delivering optical radiation at a predetermined location along an optical axis through the device, the zone plate device providing a non-rectilinear diffraction grating which diffracts incident radiation onto said optical axis (said limitation only recites facts and features that are well known and expected, the same features that essentially result from the use or application of a the zone plate device providing a non-rectilinear diffraction grating which diffracts incident radiation onto said optical axis, and therefore said limitations are said to be inherently disclosed in the teachings of Furuyama); and control means for controlling optical performance of the zone plate device wherein said control means comprises means to change the refractive index of material of the zone plate device so as to switch the optical intensity of the optical radiation delivered at said predetermined location between high and low level ((See Figs. 3A, 4, 5A, 6B and 8A-F Column 17, Lines 20 – 39 and 48 – 59, Column 20, Lines 15 – 18, Column 22, Lines 1 – 14, Column 24, Lines 14 – 47, Column 25, Lines 42 – 49 and Column 27, Lines 18 – 22)).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama et al (5, 434,426) in view of Lehovc (3,631,360).

***Regarding claim 28*** Furuyama discloses the claimed invention except for zone plate device is electro-optic. Lehovc teaches providing his device with a zone plate device is electro-optic with tunable optical device for the purpose of electro-optical structure is in which a portion of the zone plate has also an electric circuit function. It would have been obvious at the time of applicant's invention, to combine Lehovc of teaching a zone plate device is electro-optic with tunable optical device because the electro-optical structure is in which a portion of the zone plate has also an electric circuit function.

Claims 29 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama et al (5, 434,426) in view of Deacon et al (US RE37,809 E).

**Regarding claim 29 – 31,** Furuyama discloses the claimed invention except for zone plate device comprises strontium barium niobate (SBN:75) and the zone plate device comprises a piece of said material , the piece of material having zone plate elements on a first facet thereof and said predetermined location coinciding with a second facet thereof. It would have been obvious at the time of applicant's invention, to combine Deacon of teaching a zone plate device comprises strontium barium niobate (SBN:75) and the zone plate device comprises a piece of said material , the piece of material having zone plate elements on a first facet thereof and said predetermined location coinciding with a second facet thereof with tunable optical device because it would have been obvious to one having ordinary skill in the art at the time the invention was made to zone plate device comprises strontium barium niobate (SBN:75) and the zone plate device comprises a piece of said material , the piece of material having zone plate elements on a first facet thereof and said predetermined location coinciding with a second facet thereof, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

**Regarding claim 32**, Furuyama discloses the claimed invention except for zone plate device from the first facet to the second facet is at least 200 microns. It would have been obvious at the time of applicant's invention, to combine Deacon of teaching a zone plate device from the first facet to the second facet is at least 200 microns with tunable optical device because It would have been obvious to one of ordinary skill in the art at the time the invention was made to zone plate device from the first facet to the second facet is at least 200 microns, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama et al (5,434,426) in view of Barrett (3,961,188)

**Regarding claim 38**, Furuyama discloses the claimed invention except for selected frequency. Barrett teaches providing his device with a selected frequency with method of tuning an optical device for the purpose of response band of the zone plate. It would have been obvious at the time of applicant's invention, to combine Barrett of teaching a selected frequency with method of tuning an optical device because while the carrier frequency is indicated as

falling within the response band of the zone plate, it can, if desired, be selected as a frequency above that to which the zone plate will respond. Such a system may be then considered to be a single side band suppressed carrier system and will exhibit the inversion of the side band with the higher spatial frequencies of the zone plate lying adjacent the lower frequency end of the spatial response curve of the detector. A reconstruction of a hologram in which the carrier and/or one side band have been suppressed may be used for enhancement of certain features of the object such as, for example, those having high frequency components.

Claims 52 – 57 and 59 – 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuyama et al (5, 434,426) in view of Faris et al (5,680,233).

***Regarding claim 52 – 57, and 59 – 61,*** Furuyama discloses the claimed invention except for mode hop control device. It would have been obvious at the time of applicant's invention, to combine Faris of teaching a mode hop control device with tunable optical device because the mode hop control use to control to patter of motion in a variation device.

### ***Response to Arguments***

Applicant's arguments filed 5/10/2004 have been fully considered but they are not persuasive. Applicant's amendments have been fully addressed by the above-presented rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Delma R. Flores Ruiz whose telephone number is (571) 272-1940. The examiner can normally be reached on M - F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Sun Harvey can be reached on (571) -272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Delma R. Flores Ruiz  
Examiner  
Art Unit 2828



Min Sun Harvey  
Supervisor Patent Examiner  
Art Unit 2828

DRFR/MH  
August 16, 2004